

CLAIMS

1. A support arrangement which includes
a vessel to be supported;
- 5 a single vertical support for supporting the weight of the vessel; and
lateral support means at least at an elevation which is above that of
the single vertical support for providing lateral support to the vessel.
- 10 2. A support arrangement as claimed in claim 1, in which the vessel is
a core barrel of a high temperature gas cooled nuclear reactor which
includes a reactor pressure vessel within which the core barrel is housed,
the vertical support including upper and lower support members which are
connected respectively to the core barrel and the reactor pressure vessel,
between which the vertical loads are transmitted.
- 15 3. A support arrangement as claimed in claim 2, in which the core
barrel is generally cylindrical in shape and has an axis which extends
generally vertically, the upper and lower support members defining
centrally positioned oppositely disposed contact surfaces.
- 20 4. A support arrangement as claimed in claim 3, in which at least one
of the contact surfaces is curved so that relative movement between the
contact surfaces is achieved by rolling thereby reducing wear and the risk
of welding of the surfaces when operating in a helium environment.
- 25 5. A support arrangement as claimed in claim 4, in which both of the
contact surface are curved.
- 30 6. A support arrangement as claimed in claim 5, in which the upper
support member defines a downwardly facing concave contact surface,

the lower support member defining an upwardly facing convex contact surface.

7. A support arrangement as claimed in claim 6, in which the radius of
5 the convex contact surface is smaller than that of the concave contact
surface.

8. A support arrangement as claimed in claim 2, in which the vertical
support includes an intermediate member interposed between the upper
10 and lower support members.

9. A support member as claimed in claim 8, in which the intermediate
member defines upper and lower contact surface which cooperate,
respectively, with complementary contact surfaces of the upper and lower
15 support members.

10. A support arrangement as claimed in claim 9, in which the contact
surfaces of the intermediate member are convex with the complementary
contact surfaces of the upper and lower support members being concave.
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11. A support arrangement as claimed in claim 10, in which each
convex contact surface has a radius which is smaller than that of the
complementary concave contact surface.

25 12. A support arrangement as claimed in any one of claims 2 to 11,
inclusive, in which the lateral support means includes a plurality of
circumferentially spaced upper lateral supports positioned to support the
core barrel laterally at or towards an operatively upper end thereof.

30 13. A support arrangement as claimed in claim 12, in which each upper
lateral support includes a set of inner and outer upper lateral support

members connected to the core barrel and the reactor pressure vessel respectively, at least one of the inner and outer upper lateral support members of each set being mounted on a resiliently deformable support.

5 14. A support arrangement as claimed in claim 13, in which a roller element is sandwiched between the inner and outer upper lateral support members of each upper lateral support to facilitate relative displacement between the inner and outer upper lateral support members and between the core barrel and the reactor pressure vessel to which they are
10 connected.

15 15. A support arrangement as claimed in claim 14, in which the roller and at least one of the inner and outer upper lateral support members is provided with complementary teeth to ensure that relative displacement between the roller and complementary bearing surfaces of the inner and outer upper lateral support members is by rolling.

20 16. A support arrangement as claimed in claim 15, in which the bearing surfaces of the inner and outer upper lateral support members are inclined.

25 17. A support arrangement as claimed in any one of claims 13 to 16, inclusive, in which each outer upper lateral support member is mounted on a resiliently deformable support which, in turn, is mounted on an upper support ring secured to the reactor pressure vessel.

30 18. A support arrangement as claimed in claim 17, in which the resiliently deformable support includes a pair of support posts connected to the upper support ring at spaced apart positions and an elastically deformable guide beams which extends between the support posts and on which the outer upper lateral support member is mounted.

19. A support arrangement as claimed in claim 18, in which the position of the guide beam is adjustable thereby permitting the relative positions of the inner and outer upper lateral support members to be adjusted.

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20. A support arrangement as claimed in any one of claims 2 to 19, inclusive, in which the lateral support means includes a plurality of circumferentially spaced lower lateral supports positioned to provide lateral support to the core barrel adjacent to a lower end thereof.

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21. A support arrangement as claimed in claim 20, in which each lower lateral support includes an elastically deformable locating element extending radially between inner and outer receiving formations to transmit lateral loads between the core barrel and the reactor pressure vessel.

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22. A support arrangement as claimed in claim 21, in which the inner receiving formations are provided on the upper support member and the outer receiving formations are protrusions which protrude radially inwardly from a lower support ring secured to the reactor pressure vessel.

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23. A support arrangement as claimed in any one of claims 2 to 22, inclusive, which includes auxiliary support means for supporting the core barrel within the reactor pressure vessel when subjected to exceptional loads.

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24. A support arrangement as claimed in claim 23, in which the upper support member includes a central member which extends downwardly from the bottom of the core barrel and a plurality of angularly spaced support beams connected to the bottom of the core barrel and to the central member and extending radially outwardly from the central member,

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the auxiliary support means including a lower auxiliary support including a plurality of circumferentially spaced radially inwardly facing slots in which radially outer ends of the support beams are receivable with little clearance.

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25. A support arrangement as claimed in claim 24, in which the slots are defined on a radially inner surface of a lower support ring secured to the reactor pressure vessel.

10 26. A support arrangement as claimed in claim 23, in which the upper support member includes a central member which extends downwardly from a bottom of the core barrel and a plurality of angularly spaced support beams connected to the bottom of the core barrel and to the central member and extending radially outwardly from the central member
15 to an annular skirt which depends from the core barrel, the auxiliary support means including a lower auxiliary support which includes a plurality of circumferentially spaced protrusions which protrude radially inwardly from a lower support ring secured to the reactor pressure vessel and which are received with little clearance in complementary slots in the
20 skirt.

27. A support arrangement as claimed in any one of claims 23 to 26, inclusive, in which the auxiliary support means includes an upper auxiliary support comprising a plurality of circumferentially spaced ribs connected to
25 and protruding outwardly from the core barrel and complementary slots provided in and opening out of a radially inner surface of the upper support ring within which slots and portions of the ribs are receivable with little clearance.

30 28. A method of supporting a vessel which includes the steps of

transmitting the weight of the vessel with its contents to a support arrangement through a single vertical support; and

supporting the vessel laterally at least at a position which is at an elevation above that of the vertical support.

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29. A method as claimed in claim 28 which, when the vessel is in the form of a core barrel of a high temperature gas cooled nuclear reactor which includes a reactor pressure vessel within which the core barrel is supported, includes the steps of

10 transmitting the weight of the core barrel and its contents to the reactor pressure vessel through a single vertical support; and

transmitting lateral loads between the core barrel and the reactor pressure vessel through a lateral support positioned at an elevation above that of the vertical support.

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